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Pediatric Glaucoma: From Clinic to OR Getting help from AS-OCT

Dina Elfayoumi, MD

Professor of ophthalmology, Cairo University



Cairo University pediatric glaucoma team

- Professor Dr Hala Elhilali
- Professor Dr Ghada Gawdat
- Professor Dr Yasmine Elsayed
- Assistant Professor Dr Amanne Faisal



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Anterior chamber angle assessment in childhood glaucoma

- Gonioscopy is the mainstay of ACA assessment
- It is contact method, requires sedation or EUA
- It is considered subjective and requires specialized training.
- AS-OCT is a non-contact method. (unlike UBM)
- Inability of the infants to sit upright was an obstacle,
- with the introduction of hand-held AS-OCT (HH AS-OCT), examination in the supine position became possible.



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Anterior chamber angle features in primary congenital glaucoma infants using hand-held anterior segment-oct

Weam Abdeen, Amrhan F. Esmail, Ghada Gawdat & Dina El-Fayoumi

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Getting help from ASOCT IN PRIMARY CHILDHOOD GLAUCOMA



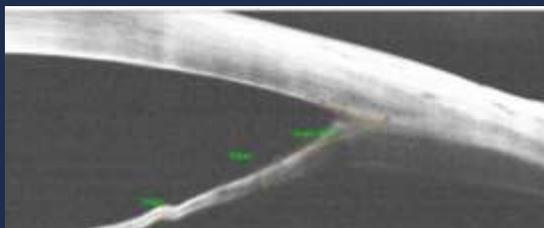
Quantitative angle measurements

- 1-Anterior chamber angle (ACA) width
- 2-Iris Thickness



1-Anterior chamber angle (ACA) width

Mean nasal and temporal ACA
Was $39.3 \pm 6.6^\circ$ & $40.1 \pm 5.3^\circ$ respectively



PCG

Mean nasal and temporal ACA was $30.4 \pm 5.6^\circ$ & $32.5 \pm 6.2^\circ$ respectively

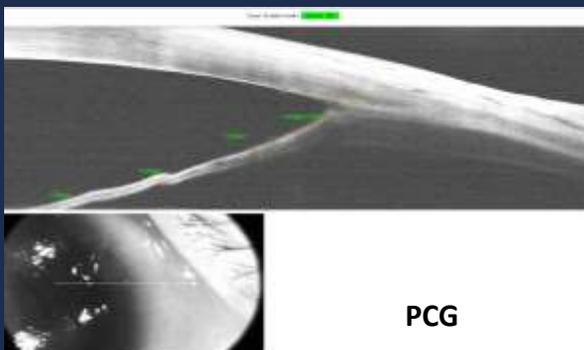


NORMAL

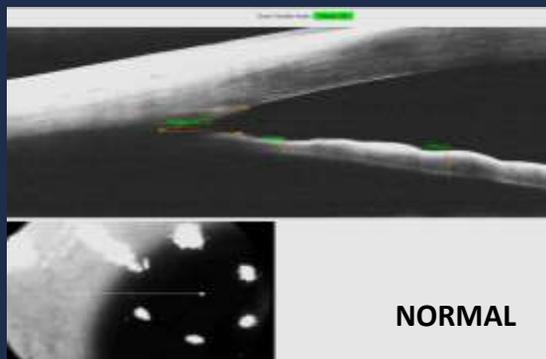


2-Iris Thickness

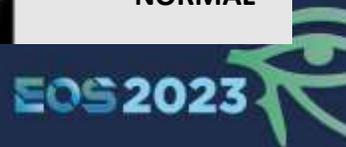
Iris thickness is significantly thinner in eyes with PCG
and correlates with the severity of the disease



PCG



NORMAL



Angle morphology

- 1- Scleral spur Identification
- 2-Trabecular meshwork identification
- 3-Schlemm's canal identification
- 4-Abnormal angle structure



1- Scleral spur Identification

Poorly identified 5 (19.23%) eyes
Clearly identified in 2 (7.7%) eyes



PCG

Poorly identified in 15 (68.2%)
Well identified in 5 (22.7%)



NORMAL



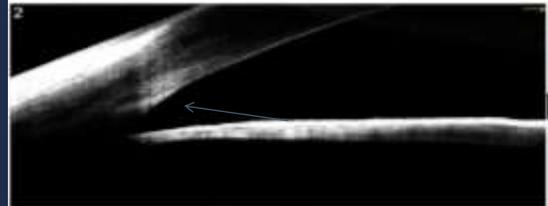
2-Trabecular meshwork identification

TM was identified in
9 (34.6%) PCG-eyes.



PCG

TM was identified in all normal eyes
(100%)



NORMAL



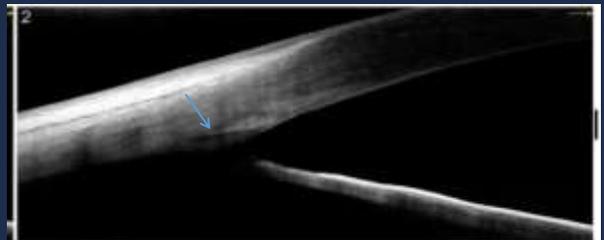
3-Schlemm's canal identification

SC was identified in
4(15.4%) PCG.



PCG

SC was identified in 16 (72.7%) normal eye

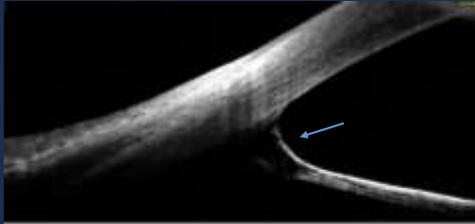


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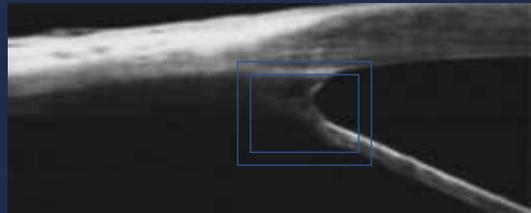
4- Abnormal angle structure

A hyper-reflective membrane was seen in 5(19.2%) PCG-eyes



PCG

Abnormal mesodermal tissue occluding the angle was seen in 7(26.9%) eyes



PCG

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What did angle examination using HH-ASOCT add?

- ◆ Confirmed that Infantile PCG is a congenital open angle glaucoma.
- ◆ Iridotrabeculodysgenesis was clearly identified
- ◆ Iris thinning is a part of the pathology
- ◆ The abnormal tissue obscuring the angle was seen.

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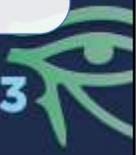


Handheld AS-OCT as a predictive tool for successful angle surgery in PCG

To show the morphological changes of the iridocorneal angle before and after surgery.

To determine the preoperative and postoperative predictive factors for success.

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Handheld Optical Coherence Tomography of the Irido-Corneal Angle before and after Goniotomy and Trabeculotomy in Primary Congenital Glaucoma

Maha Zmeter, MD; Dina El-Fayoumi, MD; Yasmine Elsayed, MD; Ghada Gawdat, MD; Hala Elhilali, MD

Accepted as an oral presentation at the 2022 Annual meeting of the American association of pediatric ophthalmology and strabismus.

From: "Levin, Alex V" <Alex_Levin@urmc.rochester.edu>
 Date: 23 March 2022 at 2:23:54 PM GMT-7
 To: Hala Elhilali <halaelhilali@yahoo.com>, ghada gawdat <ghadagawdat@yahoo.co.in>
 Subject: Congratulations!

Congratulations on winning the Pediatric Glaucoma and Cataract Family Association award for best paper/poster in the field of glaucoma at the 2022 AAPOS meeting. Your poster **Handheld Optical Coherence Tomography of the Irido-Corneal Angle before and after Goniotomy and Trabeculotomy in Primary Congenital Glaucoma** was voted the winner by our panel of AAPOS members with expertise in this field.

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PREOPERATIVE ASSESSMENT OF THE ACA IN PCG

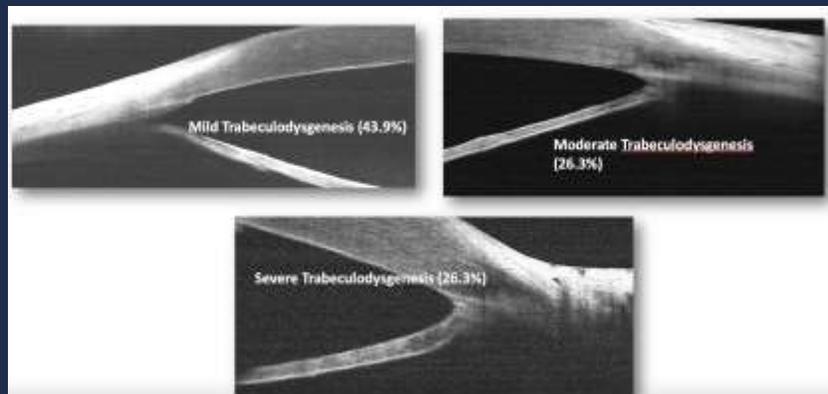
- 1-Grading of trabeculodysgenesis
- 2-Iris thickness
- 3-Corneal thicknes
- 4-Angle morphology & angle width



Correlated with the clinical severity of the disease



Grading of the severity of trabeculodysgenesis



Severity of trabeculodysgenesis was consistent with the clinical severity of the disease.

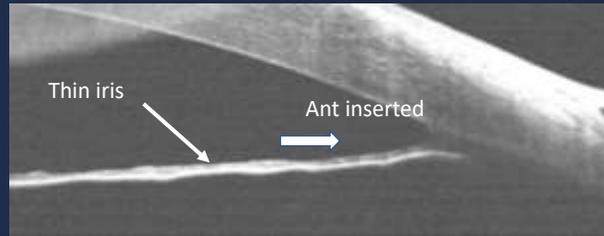


Iris thickness & Corneal thickness

Mild trabeculodysgenesis



Severe trabeculodysgenesis



Thick cornea

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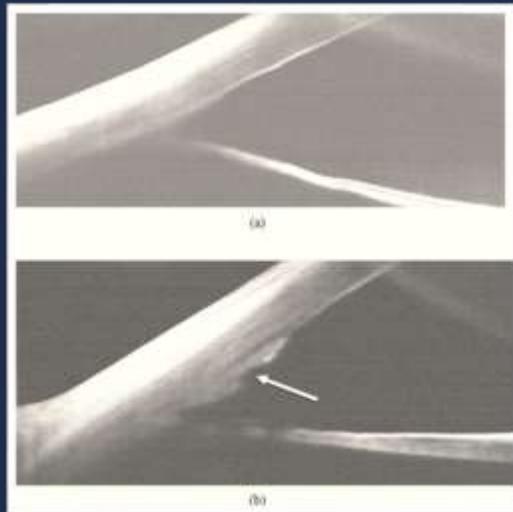
POSTOPERATIVE ACA ASSESMENT USING HH-ASOCT

- 1-Angle morphology changes
- 2-Iris thickness changes
- 3-corneal thickness changes

Compared in
Successful versus failed
angle surgery

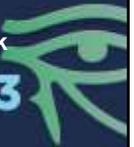
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Successful incisional goniotomy

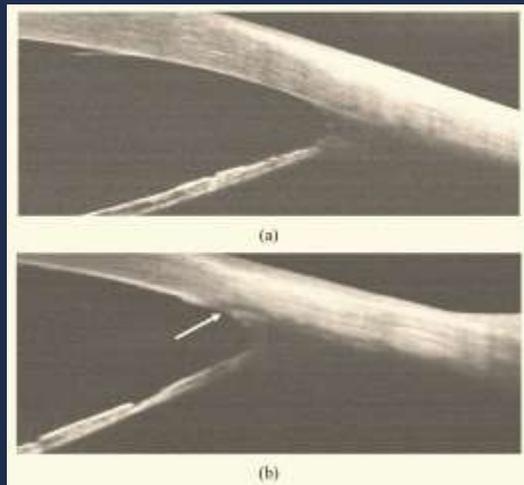


Horizontal high-resolution AS-OCT images of irido-corneal angle of the nasal side of the right eye of one of PCG patient managed with incisional goniotomy (a) preoperative image (b) postoperative image showing triangular cleft (white arrow) within the trabecular meshwork and deepening of the iridocorneal angle

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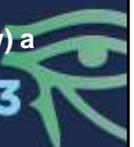


Successful excisional goniotomy using Kahook dual blade

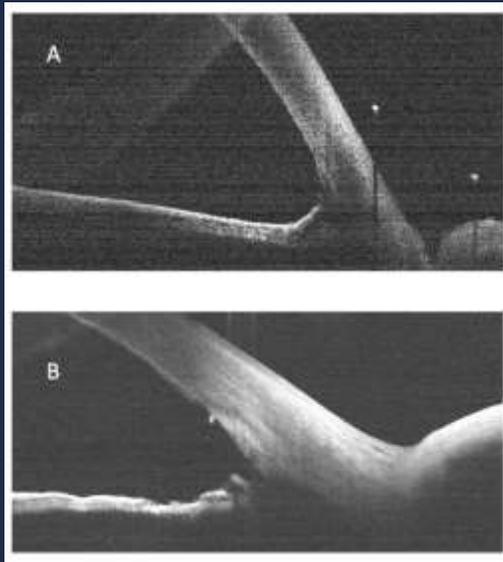


Horizontal high-resolution AS-OCT images of irido-corneal angle of the nasal side of the left eye of one of PCG patient managed with excisional goniotomy (a) preoperative (b) postoperative image showing discontinuation of TM (white arrow) a retro trabecular wide space.

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Successful trabeculotomy



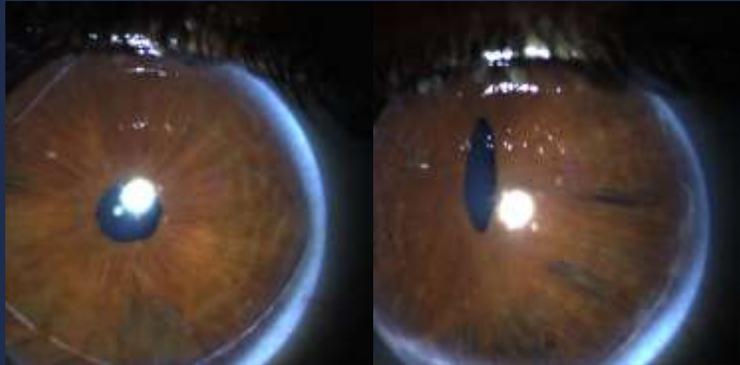
A: Horizontal high-resolution AS-OCT images of irido-corneal angle of the temporal side of the right eye of one of PCG patient managed with trabeculotomy 360 (A) preoperative image showing iridocorneal hyperreflective membrane (B) postoperative image showing interrupted membrane.



Getting help from
ASOCT IN SECONDARY
CHILDHOOD
GLAUCOMA

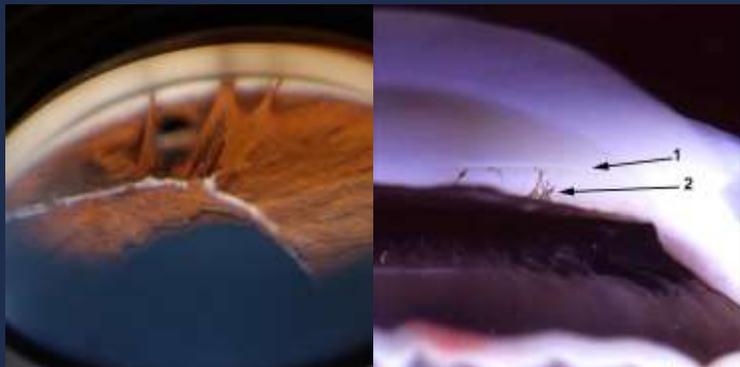
1-AXENFELD-REIGER ANOMALY/SYNDROME

- ❖ An autosomal dominant disorder
- ❖ Ranging from isolated bilateral ocular defects to a fully manifested systemic disorder.
- ❖ There is at least a **50%** risk of developing glaucoma.

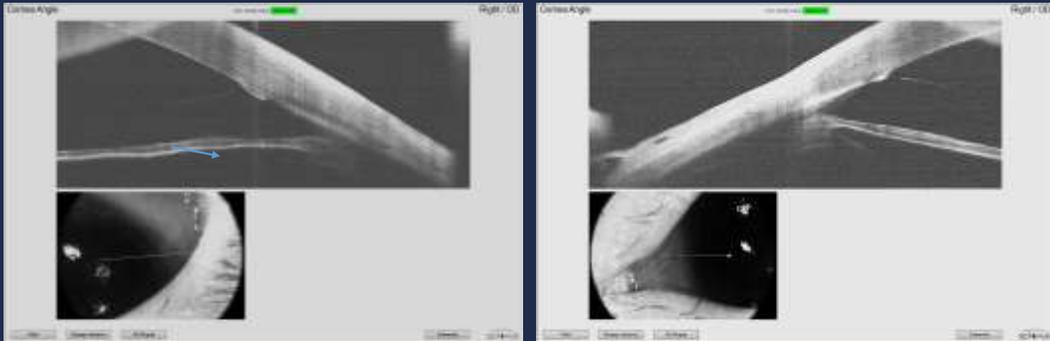


Ocular manifestations of Axenfeld-Rieger anomaly/syndrome

- ❖ Posterior embryotoxon (a thickened and anteriorly displaced Schwalbe line)
- ❖ Iris strands adherent to the Schwalbe line
- ❖ Iris hypoplasia, corectopia and polycoria
- ❖ A maldeveloped or “fetal” anterior chamber angle.



Axenfeld-Reiger anomaly



2-PETERS' ANOMALY/SYNDROME



- ❖ Most common gene mutations include PAX6 and FOXC1
- ❖ Classified into two subtypes: Type 1, and Type 2.
- ❖ Glaucoma occurs in up to 90% of the cases



Malformed posterior stromal corneal fibers.
Malformed interrupted DM.



3-GLAUCOMA IN ANIRIDIA

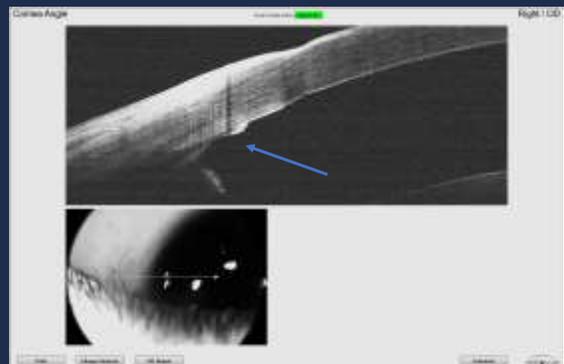
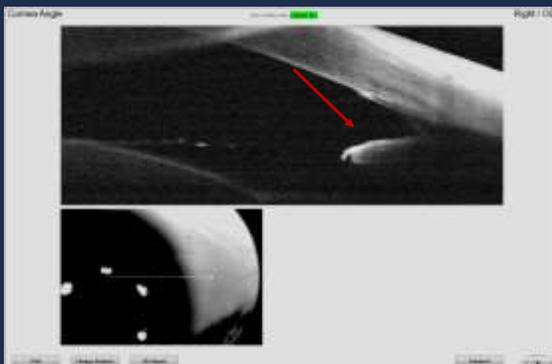
- ❖ Incidence range **6% to 75%**
- ❖ Glaucoma occurs in early adulthood.
- ❖ May occur in infants and toddlers



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ANIRIDIA OD NASAL AND TEMPORAL ANGLE



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Aniridia



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Take home message

- AS-OCT non-contact technique that doesn't require sedation or anesthesia.
- It is a very helpful tool in childhood glaucoma.
- It helped us image ACA in primary as well as secondary glaucoma.
- It is of great help in:
 - Selecting the best surgical technique.
 - Predicting prognostic factors for surgical success

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Thank you for your
kind attention !

